CITIZEN
Micro HumanTech

DOT MATRIX PRINTER

MODEL CBM-910 Type II

User's Manual

CITIZEN SYSTEMS JAPAN CO., LTD.

WEEE MARK

En If you want to dispose this product, do not mix with general household waste. There is a separate collection systems for used electronics products in accordance with legislation under the WEEE Directive (Directive 2002/96/EC) and is effective only within European Union.

Ge Wenn Sie dieses Produkt entsorgen wollen, dann tun Sie dies bitte nicht zusammen mit dem Haushaltsmüll. Es gibt im Rahmen der WEEE-Direktive innerhalb der Europäischen Union (Direktive 2002/96/EC) gesetzliche Bestimmungen für separate Sammelsysteme für gebrauchte elektronische Geräte und Produkte.

Fr Si vous souhaitez vous débarrasser de cet appareil, ne le mettez pas à la poubelle avec vos ordures ménagères. Il existe un système de récupération distinct pour les vieux appareils électroniques conformément à la législation WEEE sur le recyclage des déchets des équipements électriques et électroniques (Directive 2002/96/EC) qui est uniquement valable dans les pays de l'Union européenne.
Les appareils et les machines électriques et électroniques contiennent souvent des matières dangereuses pour l'homme et l'environnement si vous les utilisez et vous vous en débarrassez de façon inappropriée.

Sp Si desea deshacerse de este producto, no lo mezcle con residuos domésticos de carácter general. Existe un sistema de recogida selectiva de aparatos electrónicos usados, según establece la legislación prevista por la Directiva 2002/96/CE sobre residuos de aparatos eléctricos y electrónicos (RAEE), vigente únicamente en la Unión Europea.

It Se desiderate gettare via questo prodotto, non mescolatelo ai rifiuti generici di casa. Esiste un sistema di raccolta separato per i prodotti elettronici usati in conformità alla legislazione RAEE (Direttiva 2002/96/CE), valida solo all'interno dell'Unione Europea.

Du Deponeer dit product niet bij het gewone huishoudelijk afval wanneer u het wilt verwijderen. Er bestaat ingevolge de WEEE-richtlijn (Richtlijn 2002/96/EG) een speciaal wettelijk voorgeschreven verzamelsysteem voor gebruikte elektronische producten, welk alleen geldt binnen de Europese Unie.

Da Hvis du vil skille dig af med dette produkt, må du ikke smide det ud sammen med dit almindelige husholdningsaffald. Der findes et separat indsamlingssystem for udtjente elektroniske produkter i overensstemmelse med lovgivningen under WEEE-direktivet (direktiv 2002/96/EC), som kun er gældende i den Europæiske Union.

Por Se quiser deitar fora este produto, não o misture com o lixo comum. De acordo com a legislação que decorre da Directiva REEE – Resíduos de Equipamentos Eléctricos e Electrónicos (2002/96/CE), existe um sistema de recolha separado para os equipamentos electrónicos fora de uso, em vigor apenas na União Europeia.

Pol Jeżeli zamierzasz pozbyć się tego produktu, nie wyrzucaj go razem ze zwykłymi domowymi odpadkami. Według dyrektywy WEEE (Dyrektywa 2002/96/EC) obowiązującej w Unii Europejskiej dla używanych produktów elektronicznych należy stosować oddzielne sposoby utylizacji.

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ESC/POS is a trade mark of Seiko Epson Corporation.

Declaration of Conformity

This printer conforms to the following Standards:

Low Voltage Directive 73/23/EEC, 93/68/EEC and the EMC Directive 89/336/EEC, 92/31/EEC, 93/68/EEC.

LVD : EN60950-1

EMC : EN55022 Class A
EN61000-3-2
EN61000-3-3
EN55024

This declaration is applied only for 230V model.

IMPORTANT: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.
CAUTION: Use shielded cable for this equipment.

Sicherheitshinweis
Die Steckdose zum Anschluß dieses Druckers muß nahe dem Gerät angebracht und leicht zugänglich sein.

For Uses in Canada
This Class A digital apparatus complies with Canadian ICES-003.
This digital apparatus does not exceed the class A limits for radio noise emissions from digital apparatus, as set out in the radio interference regulations of the Canadian department of communications.

Pour L'utilisateurs Canadiens
Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.
Cet appareil numérique ne dépasse pas les limites de carégorie a pour les émissions de bruit radio émanant d'appareils numériques, tel que prévu dans les réglements sur l'interférence radio du départment Canadien des communications.

< GENERAL PRECAUTIONS >

1. Prior to using the printer, be sure to read this User's Manual thoroughly. Please keep it handy so that you can refer to it whenever necessary.

2. The information contained herein is subject to change without prior notice.

3. All rights reserved. Reproduction of part or all of this document is prohibited without written permission from CITIZEN SYSTEMS.

4. Except explained elsewhere in this manual, do not attempt to service, disassemble or repair this product by yourself.

5. Note that CITIZEN SYSTEMS shall not be responsible for any damage attributable to incorrect operation/handling or improper operating environments which are not specified in this manual.

6. Operate this printer only as described in this manual. Failure to do so may cause accidents or other problems.

7. Data are basically for temporary use, not stored for a long period or permanently. Please note that CITIZEN SYSTEMS is not responsible for any damage or lost profit resulting from the loss of data caused by accidents, repairs, tests, or any other occurrence.

8. If you have any question or comment regarding the information contained in this manual, please contact your CITIZEN SYSTEMS dealer.

9. Please note CITIZEN SYSTEMS is not responsible for anything that may occur from operating this printer regardless of what is stated in "8" above.

10. If you find any missing pages or pages out of order in this manual, please contact your CITIZEN SYSTEMS dealer for a replacement.

SAFETY PRECAUTIONS -WHICH SHOULD BE STRICTLY OBSERVED

In order to prevent injury hazard to operators, third parties or damage to property, special warning symbols are used in this user's manual to indicate important items to be strictly observed. Please be familiar with the following precautions before reading this manual.

- The following describes the degree of hazard and damage that could occur if the printer is improperly operated by ignoring the instructions indicated by the warning symbols.

Warning	**Neglecting precautions indicated by this symbol may result in fatal or serious injury.**
Caution	**Neglecting precautions indicated by this symbol may result in injury or damage to properties.**

This symbol is used to alert your attention to important items.

⚠ WARNING

- Never handle the printer in the manners described below; otherwise, it may be damaged, get out of order or overheated, possibly causing smoke, fire or electric shock.
  If the printer is damaged or breaks down, be sure to turn off the power, disconnect the power plug from the wall outlet, and contact your CITIZEN SYSTEMS dealer.
  - Do not allow the printer to be subjected to any strong impact or shock, such as stamping, hitting, dropping, and the like.
  - Install the printer in a well-ventilated place. Do not use the printer in such a manner that its ventilation slots are blocked.
  - Do not install the printer in a place like a laboratory where chemical reactions are expected, or in a place where saltish gases are present in the atmosphere.
  - Use the printer only on the specified voltage and frequency.
  - Do not connect/disconnect the power cord or data cable by holding the cable. Do not pull or carry the printer in such a manner that undesirable force is applied to the cables.
  - Do not drop or insert any foreign substances, such as paper clips or pins, into the printer.
  - Do not connect the printer to an electrical outlet shared by other devices.
  - Do not spill any liquid on or spray any chemical-containing liquid over the printer. If any liquid is spilled on the printer, turn it off, disconnect the power cord from the wall outlet, and contact your CITIZEN SYSTEMS dealer.
  - Do not disassemble or modify the printer in any manner; otherwise, a fire or electric shock may result.
- The plastic bag the printer came in must be disposed of properly or kept away from children. Wearing it over the head may lead to suffocation.

PRECAUTIONS FOR INSTALLATION

- Do not use or store the printer in a place exposed to heat of fire, moisture or direct sunlight, or in a place where the prescribed operating temperature and humidity are not met, or in a place exposed to oily mist, iron powder or dust; otherwise, the printer may get out of order, emit smoke or catch fire.
- Do not install the printer in a place like a laboratory where chemical reactions are expected, or in a place where saltish gases are present in the atmosphere; otherwise, there may occur a danger of fire or electric shock.
- Install the printer on a sturdy and good ventilation place and free from any vibration. (Be careful not to block the ventilation slots of the printer.)
- Do not put any object on the printer, or this may cause a trouble.
- Do not use the printer near a radio or television receiver. Avoid sharing an electrical outlet with a radio or television receiver, or this may cause a reception problem.
- Use the printer only on the specified voltage and frequency; otherwise it may emit smoke, catch fire or cause other problems.
- Confirm that the wall outlet used for printer connection has sufficient electrical capacity.
- Avoid sharing a single electrical outlet with other devices; otherwise, the electrical capacity may be exceeded, causing the outlet to overheat or the power supply to be shut down. Also, do not stamp or put any object on the cables.
- Never connect the grounding cable to a gas pipe, or this may lead to a danger of explosion. Before connecting or disconnecting the grounding cable, be sure to disconnect the power plug from the wall outlet.
- Be sure to turn off the power of the printer and the host computer connected before connecting or disconnecting the cables; always hold both plug and cable. Do not pull or carry the printer in such a manner that an undesirable load is applied to the cables.
- Connect the connector cables correctly and securely. Especially, if a connection is made with the polarity reversed, internal elements inside the printer may be damaged or the host computer connected may be adversely affected.
- Use shielding wires or twist paired wires for signal lines in order to minimize the effects from noise. Avoid connecting to a device that is likely to generate much noise.
- Install and use the printer in a place provided with a suitable wall outlet nearby so that you can immediately disconnect the power plug to shut off the power to the printer if an abnormal condition occurs.
- When transporting the equipment, remove the paper roll from it.

PRECAUTIONS FOR HANDLING

Do not handle the equipment in the following manners, because problems may result.

- Do not print when there is no recording paper or ink ribbon set in the equipment.
- Be careful not to drop foreign substances, such as clips, pins, and screws, into the equipment.
- Do not spill any liquid or spray any chemical-containing liquid over the equipment.
- Do not stamp on, drop, hit, or give a strong shock to the equipment.
- Never use a pointed object, such as a pen, to operate the operation panel.
- Do not use Scotch tape to fasten paper together for continuous use.
- Never pull the set paper forcibly.
- Replace the ink ribbon before it is broken by overuse. Do not refill the ink ribbon.
- Leaving the printer unused for a long time with a ribbon cassette loaded may cause smudged printing. Continuous printing at low temperature may cause thin printing due to the characteristic of ink.
- Do not deliver the equipment with a ribbon cassette loaded.

To Prevent Injury and Spreading of Damage

- Do not touch the printing part of the print head.
- While the equipment power is on, do not touch the moving parts, such as a cutter and gear, or electric parts inside the equipment.
- Be careful to avoid bodily injure or damaging other objects with an edge of sheet metal.
- Should any error occur while operating the equipment, stop using it immediately, disconnect the power plug from the plug socket, and then contact your CITIZEN SYSTEMS dealer.

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1. INTRODUCTION

The CBM-910II is a dot-impact printer widely usable with various data communication terminals and measurement terminals.
This printer, being extremely compact and equipped with extensive functions, is suitable to a wide range of applications.
Read this manual thoroughly to understand the product before use.

1.1 Features

- Compact desk-top dot matrix printer
- Light weight
- High speed printing
- Paper-near-end detecting function
- Conformity to RS-232C and Centronics.
- Low power consumption
- Low price
- Wall mountable

1.2 Accessories

Confirm that the printer is supplied together with the following accessories.

Paper roll (1 roll)
Ribbon cassette (1 unit)
AC adapter (1 unit)
User's manual (1 booklet)

2. TYPE CLASSIFICATIONS

2.1 Type

The product is categorized according to the naming plan indicated below.

CBM-910II	24 40	P R	J F	100 120 230	A B

CBM-910II - 24 R J 100 - A

Model Name

Number of columns
24: 24 columns/144 dots
40: 40 columns/180 dots

Interface
P: Parallel (Conformity to Centronics)
R: Serial (RS-232C)

Character set
J: Japan
F: International

Adapter
100: For AC 100 V
120: For AC 120 V
230: For AC 230 V

Printer cover
A: 60 mm (Dia.) Paper roll
B: 80 mm (Dia.) Paper roll

2.2 AC Adapter

Please use the exclusive adapter indicated below.

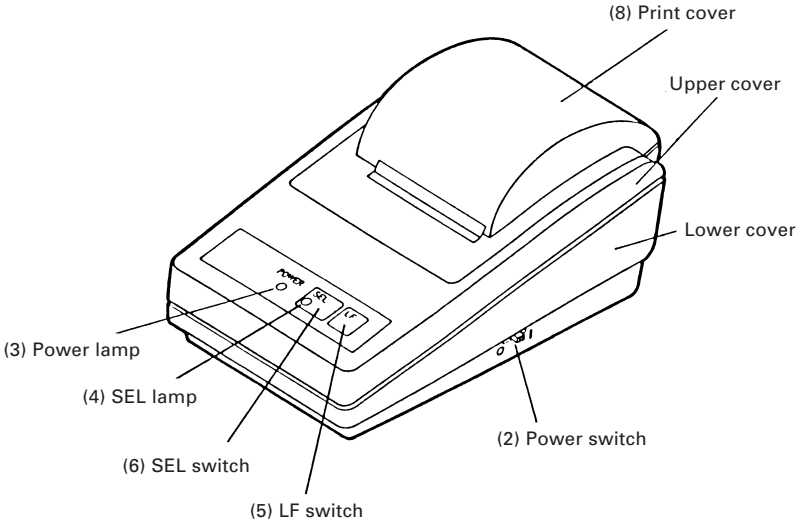
91AD-J (AC 100 V)
91AD-JU (AC100V, AC 120 V)
91AD-E (AC 230 V)

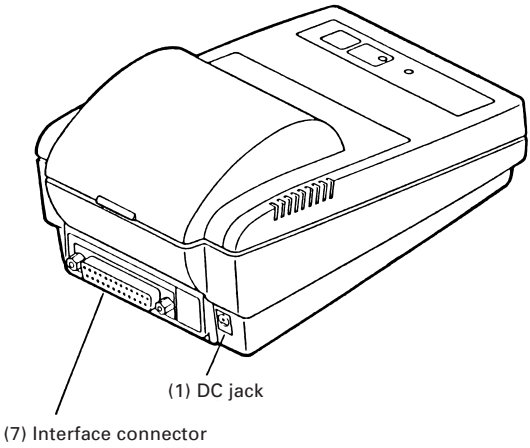
2.3 Specifications

Item		CBM-910II-24	CBM-910II-40
1	Printing method	Dot matrix	
2	Printing direction	One-way printing	
3	Character configuration (W × H)	(5 + 1) × 8	(4 + 0.5) × 8
4	Number of columns per line	24 columns: 144 dots/line	40 columns: 180 dots/line
5	Printing speed	Approx. 2.5 lines/sec.	Approx. 1.8 lines/sec.
6	Character size (W × H)	1.62 × 2.4 mm	1.08 × 2.4 mm
7	Character spacing	1.98 mm	1.19 mm
8	Line pitch	3.52 mm	
9	Paper feed speed	Approx. 5 lines/s	Approx. 3.6 lines/s
10	Paper	Single sheet, copier paper (original and copy), Total thickness: 0.13 mm or less Paper roll: 57.5 ±0.5 (W) × 60 or 80 (Dia) mm Core ID: ϕ12 ±1 mm Core OD: ϕ18 ±1 mm	
11	Interface	Parallel Interface (Conformity to Centronics) or Serial Interface (RS-232C)	
12	Input buffer	2k bytes/72 bytes (Selectable by memory switch on Serial I/F model)	
13	Emulation	CBM-910 emulation and IDP3110 emulation (selectable with memory switch)	
14	Code page	PC437, 852, 857, 858, 860, 863, 864, 865, 866, 869, WPC1252, Katakana, CBM-910 emulation (Japan, International)	
15	Paper-near-end detection	Printing suspended when printing paper gets scarce.	
16	Ink ribbon	Purple (Private ribbon cassette) Service life: approx. 250,000 letters	
17	Voltage	DC 7 V ±1 V (Printing) Use exclusive adapter (DC 7 V 1.6 A)	
18	Power consumption	Printing: Approx. 7 VA Stand-by: Approx. 0.5 VA	
19	Weight	Approx. 470 g	
20	Reliability	MCBF: 1.5 million lines	MCBF: 1 million lines
21	Dimension	106 (W) × 180 (D) × 88(H) mm	
22	Operating temperature and humidity	0 to 40°C, 35 to 85% RH (without condensation)	
23	Storage temperature and humidity	–20 to 60°C, 10 to 90% RH (without condensation)	
24	Specifications	CE Marking/TUV- GS/FCC class A/VCCI class A (AC adapter PSE/UL/C- UL/TUV- GS)	

3. EXTERNAL APPEARANCE AND PART DESCRIPTIONS

3.1 External Appearance





3.2 Part Descriptions

(1)	DC jack	Insert the output plug of the AC adapter attached.
(2)	Power switch	When switched ON, power is supplied to the printer and the Power lamp goes on.
(3)	Power lamp	Lighted when power is turned ON and goes out when turned OFF. Blinks during memory switch setting and at the occurrence of memory error. While memory switch setting error is present, the Power lamp blinks at 1/10-second intervals. While memory error is present, the Power lamp and the SEL lamp blink simultaneously at 1/10-second intervals. The memory switch setting error can be recovered by resetting but memory error is not recoverable.
(4)	SEL lamp	Printer lights up in Select (ON LINE) state, and is put off in Deselect (OFF LINE) state. Printing operation is available only while this lamp is lit. 1) It blinks, for paper-near-end, at 0.5-second intervals. Supply paper and press the SEL switch to turn off the lamp. 2) On occurrence of any alarm state (blinking) due to any reason other than paper-near-end, it starts blinking at 1/4-second intervals. Eliminate the cause and either press SEL switch or turn the power off and on again to stop blinking.
(5)	LF switch	Paper is fed when switch is pressed (deselect condition only). Used to supply paper or to insert some space in the output.
(6)	SEL switch	Printer is selected (ON LINE) by pressing this switch. Printer is deselected (OFF LINE) by pressing the switch again. Also used to release alarm state. In Deselect state, if data still remain in the input buffer, they are all printed out.
(7)	Interface connector	Printer is connected to various hosts via cables. Please ensure that both the printer and the host are turned off before connecting.
(8)	Printer cover	Opened to exchange ribbon cassette and paper roll.

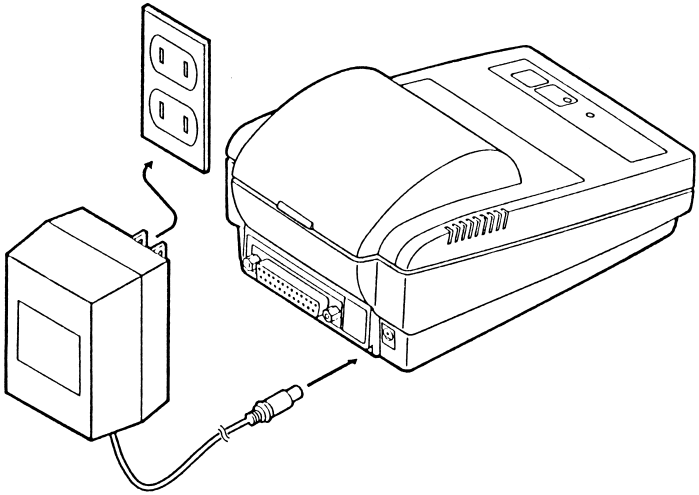
4. OPERATIONS

4.1 Connection of the AC Adapter

(1) Ensure that the power switch is OFF.

(2) Insert the output plug of the AC adapter into the DC jack of the printer.

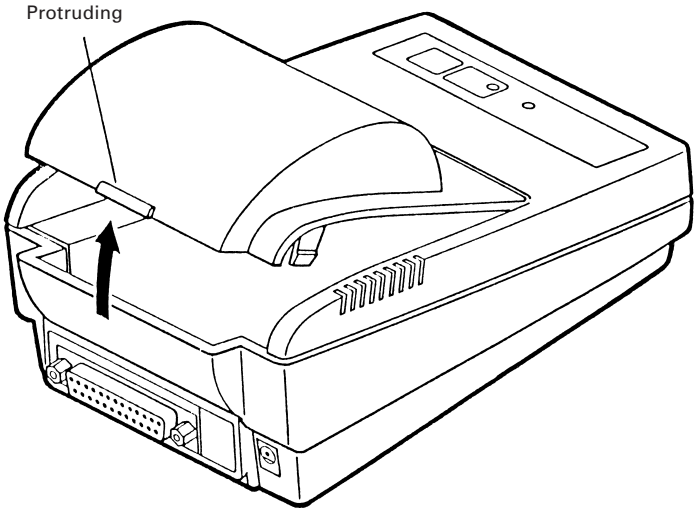
(3) Insert the power plug of the AC adapter into a power outlet supplying the designated voltage. (Be sure to use an AC adapter for the power source.)



4.2 Setting of the Printer Cover

(1) Hold the protruding section at the rear of the printer cover and lift in the direction indicated.

(2) Attach the cover by pressing downward after hooking the cover to the acceptor located in the front part.

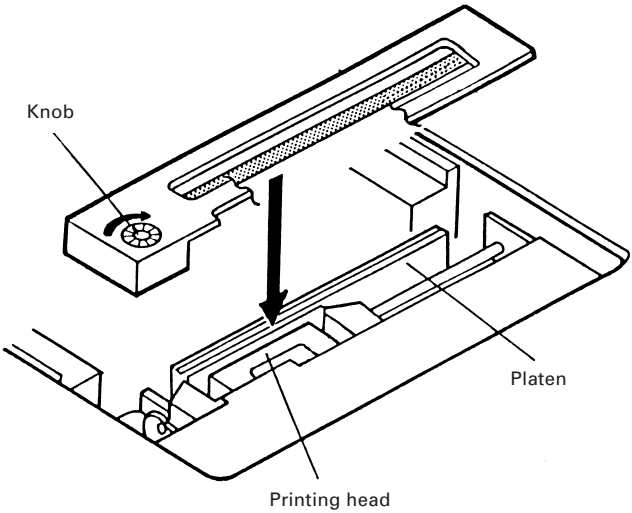


4.3 Setting Ribbon Cassettes

(1) Remove the printer cover turning OFF the printer.

(2) Press down on the Ribbon cassette while inserting the ribbon between the printing head and the platen.

(3) Wind up the ribbon slack by turning the knob in the direction of the arrow.



4.4 Setting Paper

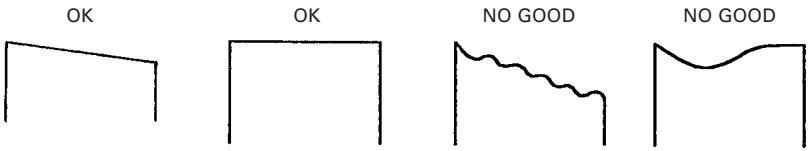
(1) Remove the printer cover.

(2) Ensure that the end of the paper is straight or incline as indicated in the diagram.

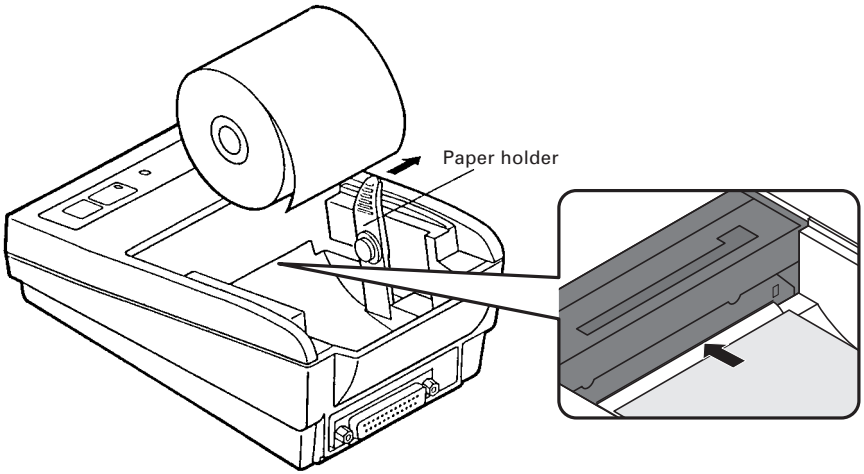
(3) Insert printing paper with the paper holder turned down in the arrow-indicated direction, hold the core.

(4) Insert paper into the slot of the printer mechanism.

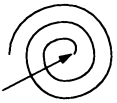
(5) Following turning-on of the power switch, as pressing the LF switch, take out printing paper by 5 to 6 cm from the printer mechanism. As passing the paper through paper outlet, mount the printer cover.
(LF switch works when SEL lamp is off.)



Note: Paper, if held aslant at the paper feed or the paper discharge side, may cause paper jamming. On occurrence of the above, immediately turn off the power and slowly pull out the jammed paper upright.



* SPECIAL REMARKS CONCERNING PAPER
SHAPE: The beginning of winding (end part of the inside diameter) should satisfy the following (Refer to Drawing A):
1. Free of fold and well aligned to inside diameter
2. Free of flaps
3. Not adhered to core part (if there is one)



The beginning of winding

Drawing A

Not accepted

RECOMMENDED PAPER:
Single paper ... 45 ~ 55 kg/1,000 sheets/1,091 × 788 mm
Copy paper ... Non-carbon paper/original (34 kg-paper) + copy 1 sheet (34 kg-paper)
Total thickness ... 0.13 mm or less

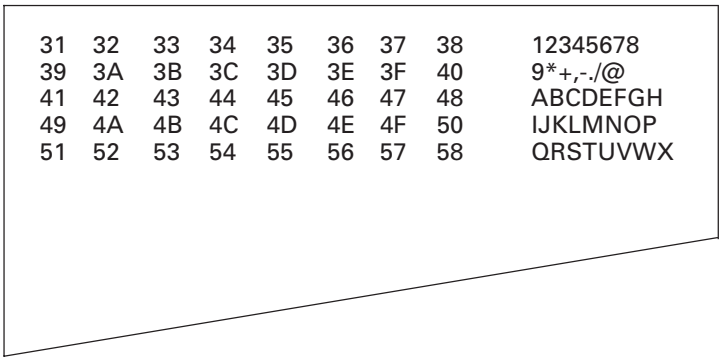
4.5 Self-Printing Function

When activating self-printing function, be sure to start with a paper loaded (or in the printable state).

(1) Test printing
Turn the printer power on while pressing and holding the LF switch, and the printer starts printing the status of current setting of DIP switch (including the content of setting in case of serial printer) and all characters available with the printer.
The SEL lamp is held off and BUSY signal is output during test printing.
On completion of test printing, the printer enters the standby state awaiting print data.

(2) Hexadecimal dump mode
Turn the printer power on with the LF switch and SEL switch pressed and held.
The printer prints Hexadecimal Dump characters and then prints all data sent from the host in hexadecimal code.
When data for the last line is not sufficient for full one line, data of the last line is printed out with SEL switch pressed and deselected (OFF LINE).
This mode lasts till power is turned off.

Example of Printing in Dump Mode



4.6 Memory Switch Setting

<Memory Switch Initial Setting>

	Japan (910JPN)
International character selection	Japanese
Code page	910-compatible (Japan)
Emulation	CBM910
Ack timing	After
Paper-near-end selection	Valid
SEL/DESEL at power ON	SEL
Busy signal clear timing	Standard
Buffer Size (Serial I/F)	2k bytes

Memory switch can be changed by a command or by manual operation.

a) Change by command
Memory switch can be changed by a command. For details, refer to 8. Print Control Function.
When the printer receives the command, it outputs a BUSY signal and enters memory setting mode. After writing into memory switch, software resetting is carried out and the receive buffer/print buffer are cleared causing each set value to return to the initial value and then the contents of the memory switch(es) are reloaded.

b) Change by manual operation
Turn the printer power on with DIP switch No. 4 set to ON and by pressing and holding the SEL switch. The printer prints the information on the current memory switch setting and then enters the Change Setting mode.
In this case, the POWER lamp blinks at 1-second intervals while the SEL lamp is kept turned off and BUSY signal outputted.
Using the SEL switch and LF switch, choose one of the options for each setting item. Then memory switch can be set or changed. Setting items and options are printed each time the switch is pressed.
The SEL switch allows the option being printed to be determined as the set value for current setting item, advancing to the next option item. The LF switch allows the option currently being printed to be deselected among the same setting items and the next option item to be printed.
To fix the value set by the memory switch when the option item of the last setting items is selected, press the SEL switch. To restart setting from the first setting items, press the LF switch.

NOTE

Before turning the printer power on, restore the DIP switch No. 4 to the former position.

<Contents of Memory Switch Setting>

In square brackets ([ ]), choose one of the options for each setting item. Item marked * is the default setting.

1. Country (Selecting international character set)
   [*USA, FRA, GER, U.K, DEN, SWE, ITA, SPE, JPN]
   Selects a international character set.
   For international character set, refer to International Character Code Table.

USA = U.S.A	SWE = Sweden	JPN = Japan
FRA = France	ITA = Italy	GER = Germany
SPA = Spain	U.K = U.K.	DEN = Denmark

2. Code page (Selecting code page)
   [CP-437, Katakana, CP-858, CP-860, CP-863, CP-865, CP-852, CP-866, CP-857, Windows, CP-864, CP-869, *910Intl, *910JPN, Space]
   Selects a code page.
   For code page, refer to Character Code Table.
   Among the character sets for model type, model F is defaulted to 910Intl and model J to 910JPN.

CP-437 = Codepage PC437	Katakana = Katakana
CP-858 = Codepage PC858	CP-860 = Codepage PC860
CP-863 = Codepage PC863	CP-865 = Codepage PC865
CP-852 = Codepage PC852	CP-866 = Codepage PC866
CP-857 = Codepage PC857	Windows = Codepage WPC1252
CP-864 = Codepage PC864	CP-869 = Codepage PC869
910Intl = 910 Emulation (International)	910JPN = 910 Emulation (Japan)
Space = Blank page for user's setting	

3. Emulation (Selecting 910/3110 Emulation)
   [*CBM-910, iDP-3110]
   Sets command system to 910 Emulation or 3110 Emulation.

4. ACK Timing (ACK timing)
   [Before, Center, *After] *1
   ACK output timing for parallel I/F can be changed in 3 steps.
   For details, refer to the description of Parallel Interface.

5. P.N.E. Sensor (Enable/Disable paper-near-end)
   [*Enable, Disable]
   This setting allows selection between Enable/Disable of paper-near-end sensor.

6. P-ON Sel (Online status at Power ON)
   [*Select, Deselect]
   Selects the status of the SEL switch on the operation panel at power ON.

7. BUSY (Busy signal clear timing)
   [*Standard, CBM-910] *1
   Selects the clear timing of Busy signal for parallel I/F.
   Standard: Clears after confirming the rise of STB signal.
   CBM-910: Clears after completing data storage to input buffer.

8. Buffer
   [*2k bytes, 72 bytes]
   Select buffer size.

*1: For ACK timing and Busy timing, only setting the parallel board is available.

4.7 Paper-Near-End, Mechanical Alarm, Memory Error

(1) Paper-near-end
Printing paper shortage is detected and informed with SEL lamp blinking at 0.5-second intervals, where printing is suspended. At this time, power supply to the motor and printing solenoid is stopped with BUSY signals output in the host computer. To recover from Paper-near-end state, set new paper and press SEL switch twice. LF functions normally.

(2) Mechanical alarm
On occurrence of locked motor, any kind of trouble in the mechanism is suspected. Power supply to the motor and printing solenoid is stopped and BUSY signals are output in the host computer. SEL lamp is then blinked at 1/4-second intervals. To recover from alarm state, eliminate the trouble cause and press SEL switch twice. If it is in the course of printing, printing is started at the beginning of the interrupted line. (Content of the input buffer is still held.) However, this dose not apply to a case where power has been cut due to a severe trouble.

(3) Memory error
This error is developed when any abnormality is detected by the self-diagnosis of memory by the CPU when the equipment is powered on. A BUSY signal is output to the host causing the POWER lamp and SEL lamp to blink simultaneously at 1/10-second intervals. This error is an unrecoverable error. Turn the equipment power off and contact your CITIZEN SYSTEMS dealer.

(4) Memory switch setting error
This error is developed when any abnormality is detected in the setting of memory switch when the equipment is powered on.
The alarm causes the POWER lamp to blink at 1/10-second intervals. This error is recovered by resetting the memory setting with a command and turning the equipment power on again.

4.8 General Remarks

(1) Do not print without ink ribbon properly provided. It may cause damage on the print head.

(2) Replace the ink ribbon with a new one before it becomes worn-out. Do not replenish ink.

(3) Be careful not to drop foreign substances, such as a clip and a pin into the equipment. Otherwise, equipment failure may result.

(4) To operate the printer, be sure that the printer is placed on a flat stable place. If the table is not flat or stable, the printer may be displaced by vibrations during printing, resulting in a possible danger. Fixing it stationary is also important to avoid erroneous operation.

(5) To clean the surface of the printer, never use organic solvent (alcohol, thinner, benzine, or the like).

(6) Paper, if left for a long time with a ribbon cassette mounted, may cause the print paper to be stained. Also, continuous printing, if conducted at a low temperature, may cause thin printing due to the ink characteristics.

(7) Do not deliver the printer with a ribbon cassette loaded.

5. PARALLEL INTERFACE

5.1 Specifications

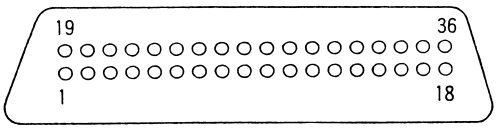
(1) Data input system: 8 bit parallel (DATA 1-8).

(2) Control signal: $\overline{\text{STB}}$, $\overline{\text{ACK}}$, BUSY, P.N.E., SELECT, $\overline{\text{RESET}}$

(3) Compatible connector:
Printer side: 57LE-40360 (ANPHENOL or equivalent)
Cable side: 57-30360 (ANPHENOL or equivalent)

5.2 Connector Pin Assignment

Pin	Signal Name	Pin	Signal Name
1	$\overline{\text{STB}}$	19	TWISTED PAIR GND
2	DATA 1	20	
3	DATA 2	21	
4	DATA 3	22	
5	DATA 4	23	
6	DATA 5	24	
7	DATA 6	25	
8	DATA 7	26	
9	DATA 8	27	
10	$\overline{\text{ACK}}$	28	
11	BUSY	29	
12	P.N.E.	30	TWISTED PAIR GND
13	SELECT	31	$\overline{\text{RESET}}$ *1
14	GND	32	FAULT *2
15		33	GND
16	GND	34	
17	FRAME GND	35	
18		36	



*1: For RESET signal, Enable/Disable can be selected by DIP switch No. 3.
*2: Changing the internal resistance enables H/L level (fixed).

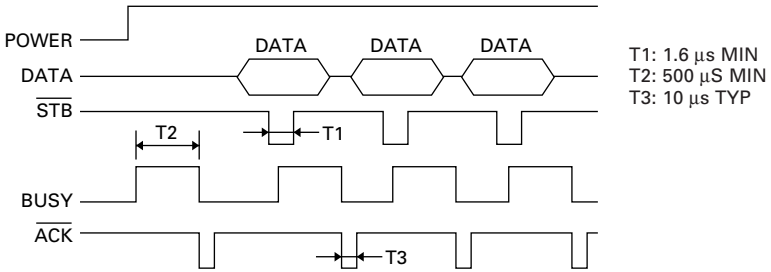
5.3 Description of Input/Output Signals

(1) Input signal
- DATA 1 to DATA 8 . . . 8 bit parallel signal (positive logic)
- $\overline{\text{STB}}$ . . . Strobe signal for reading out data (negative logic)
- RESET . . . Signal for resetting the entire unit (negative logic 4 ms or more)

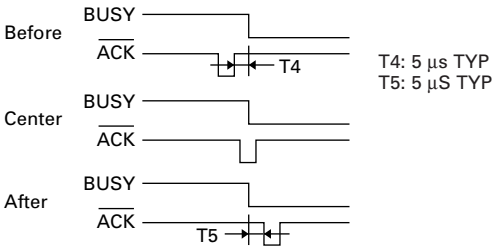
(2) Output signal
- $\overline{\text{ACK}}$ . . . 8 bit data signal for requesting data. ACK is issued at the end of the BUSY signal (negative logic)
- BUSY . . . Signal indicating the printer is busy. Input new data when the signal is in "LOW" condition (positive logic)
- SELECT . . . Signal to indicate this equipment is in the SELECT (ready for communication) state (positive logic)
  "LO"is output in the state deselected by the operation panel (SEL-SW), mechanical error, or memory error.
- P.N.E. . . . Signal to be output for paper-near-end

(3) Other
- GND . . . Ground commonly used in the circuit
- FRAME GND . . . Frame ground (case ground)

(4) Timing chart



Busy signal timing: Clear timing can be selected by the memory switch.
ACK signal timing: The following kinds of timing can be selected by the memory switch setting.



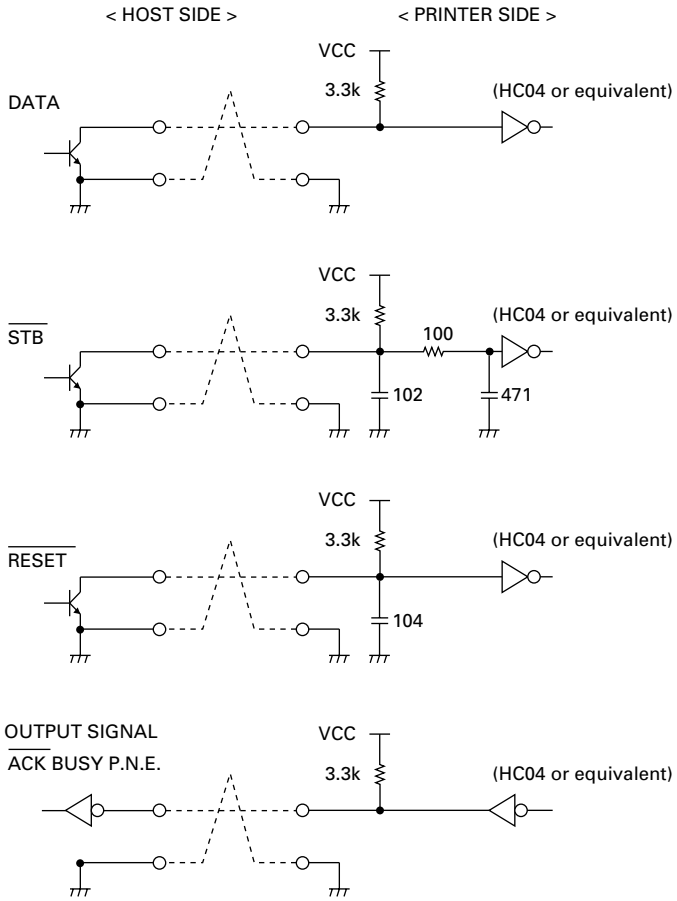
5.4 Electrical Characteristics

(1) Input signal level
All inputs are HCMOS level. As the input side is pulled up with a resistance of 3.3 kΩ, it can be used at TTL level.

TTL Level	HCMOS Level
"HIGH" level: 2.0 V MIN	"HIGH" level: 4.0 V MIN
"LOW" level: 0.8 V MAX	"LOW" level: 1.0 V MAX

(2) Output signal level
Output signal level is held at TTL.

(3) I/O conditions



6. SERIAL INTERFACE

6.1 Specifications

(1) Synchronization: Asynchronous

(2) Baud rate
1200, 2400, 4800, 9600, 19200 Baud/sec (User selection)

(3) Word configuration
- Start bit: 1 bit
- Data bit: 7 bits or 8 bits (User selection)
- Parity bit: odd, even, no parity (User selection)
- Stop bit: 1 bit or more

(4) Signal polarity
RS-232C
- Mark = Logic "1" (–3 V to –12V)
- Space = Logic "0" (+3 V to +12 V)

Selecting presence or absence of signal is available with TTL ($\overline{\text{RESET}}$) DIP switch No. 3.
- H level = Logic "1"
- L level = Logic "0"

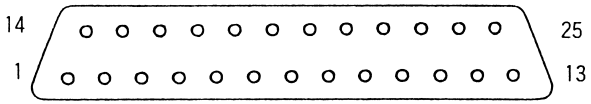
(5) Receive data (RD)
- Mark: "1"
- Space: "0"

(6) Transmit data (TD)
- Mark: "1"
- Space: "0"

(7) Received control data (DTR) (DTR signal)
- Mark: Data transmission not possible
- Space: Data transmission possible

6.2 Connector Pin Assignment

Pin	Signal Name	Signal Direction Host-Printer	Function	RS-232C	TTL
1	FG		Frame ground	O	
7	GND		Signal ground	O	
2	TD	←	Transmit data	O	
3	RD	→	Receive data	O	
20	DTR	←	Printer BUSY signal	O	
23	$\overline{\text{RESET}}$ (L)	→	TTL Reset signal *1		O
25	RESET	→	Reset signal *1	O	



*1: Enable/Disable of RESET signal can be selected by DIP switch No. 3.
In addition, changing the internal resistance allows selection of pin 23/pin 25.
In Factory setting, pin 23 (TTL Reset) is set.

Note: 1. Signals for RS-232C are based on EIA RS-232C level.
Applicable connector (D-sub connector)
Printer side: 17LE-13250 (Anphenol or equivalent)
Cable side: 17JE-23250 (Anphenol or equivalent)

6.3 Description of Input/Output Signal

(1) Input signal

1) TD (TRANSMIT DATA)
Serial transmission data signal.

2) RD (RECEIVE DATA)
Serial receive data signal.

3) DTR (DATA TERMINAL READY)
Input command or data while this signal is in ready state (space). Data input while the signal is BUSY (mark) will cause an overrun error to occur. Data can be provided to the input buffer even if the printer is printing. Busy state may also occur when power is applied, or during test printing, on-line, or when the printer is reset.

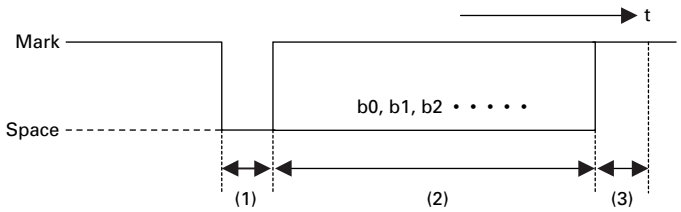
4) $\overline{\text{RESET}}$ (L) (TTL level)
Signal for resetting the whole printer. Reset is activated with L level of 4 ms or more.

5) RESET (RS-232C level)
Signal for resetting the whole printer. Reset is activated with Space of 4 ms or more.

6) FG (FRAME GND)
Case ground.

7) GND
Signal ground for the circuit.

(2) Data configuration



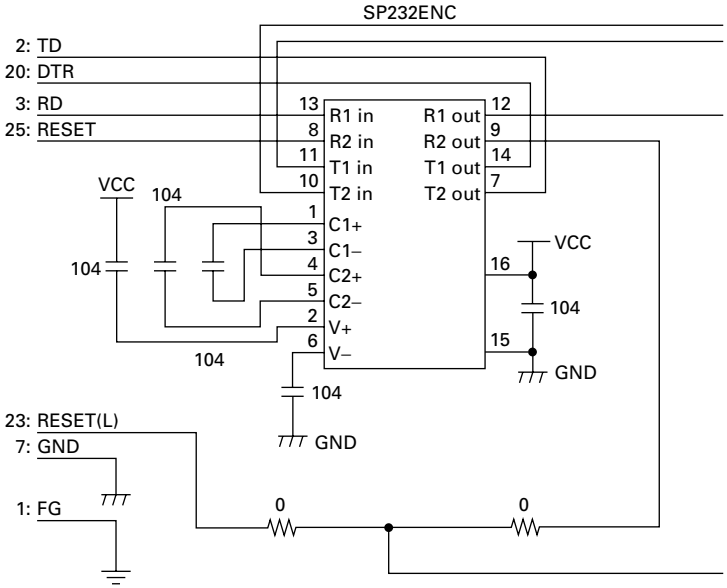
(1) Start bit (1 bit)
(2) Data bit (8 bits)
(3) Stop bit (more than 1 bit)

6.4 Electrical Characteristics

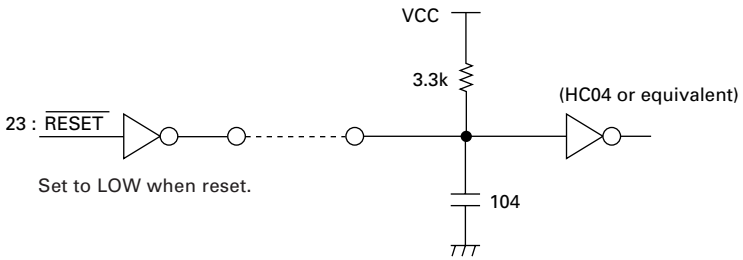
(1) RS-232C I/O signals (RD/TD/DTR)

- Input (RD)
  Mark = (–8 V): Stop bit
  Space = (+8 V): Start bit

- Output (TD, DTR)
  Mark = (–8 V): For Busy
  Space = (+8 V): For Ready



(2) TTL circuit
Input ($\overline{\text{RESET}}$)



6.5 Error Detection

- Communication error

  - Parity error
    Parity error occurs when parity check is specified and parity is not observed in the even and odd parity checks.

  - Framing error
    When space state detected on detection of stop bit.

  - Overrun error
    When next following data having been transferred to receiving buffer register regardless of presence of data in that receiving buffer register.

On occurrence of the above error, convert data at the time of occurrence into ■ (7FH) to print it out.

RECEIVING CONTROL AND BUFFERING

This equipment controls, on receipt of print data, receiving (DTR Control) in one-word unit. If the host disregards DTR and carries out data transmission at this time, overrun of receiving data may be resulted. This state should be avoided on the host's responsibility. (The data discharging type host cannot follow this.) This is applicable when the host adopts a double buffer type transmitter.

7. DIP SWITCH SETTING

7.1 Serial Interface Type

Switch No.	Function	OFF	ON	Factory Setting
1	Character direction	Normal	Inverted	OFF
*1 2 (3110)	CR	—	—	OFF
*1 2 (910)	CR	Ignore CR	CR + LF	OFF
3	Reset in	Disable	Enable	ON
*2 4	Bit length	8 bits	*3 7 bits	OFF

*1: A difference is developed by the emulation set by the memory switch.
*2: After setting DIP switch No. 4 to ON, turning the printer power on with the SEL switch pressed and held causes the printer to enter the Manual memory switch setting mode. With normal power on operation, bit length setting is active.
*3: This setting may cause some restrictions such as limiting the argument of control code or incomplete format of data in bit image printing.

Baud rate and parity selection

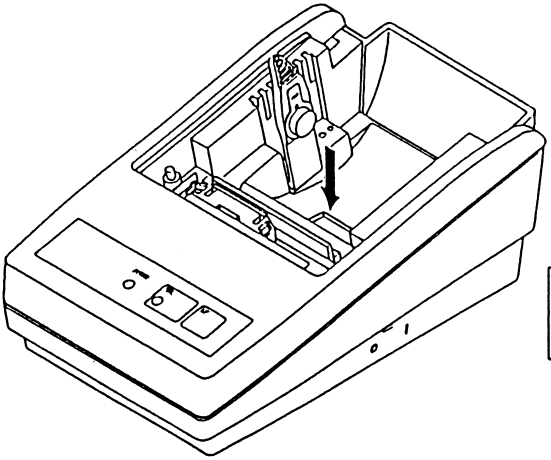
Switch No.				Parity	Baud Rate	Factory Setting
8	7	6	5			
OFF	OFF	OFF	OFF	None	4800	O
OFF	OFF	OFF	ON	None	1200	—
OFF	OFF	ON	OFF	None	2400	—
OFF	OFF	ON	ON	None	4800	—
OFF	ON	OFF	OFF	None	9600	—
OFF	ON	OFF	ON	None	19200	—
OFF	ON	ON	OFF	Odd	1200	—
OFF	ON	ON	ON	Odd	2400	—
ON	OFF	OFF	OFF	Odd	4800	—
ON	OFF	OFF	ON	Odd	9600	—
ON	OFF	ON	OFF	Odd	19200	—
ON	OFF	ON	ON	Even	1200	—
ON	ON	OFF	OFF	Even	2400	—
ON	ON	OFF	ON	Even	4800	—
ON	ON	ON	OFF	Even	9600	—
ON	ON	ON	ON	Even	19200	—

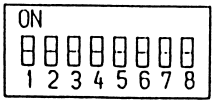
7.2 Parallel Interface Type

Switch No.	Function	OFF	ON	Factory Setting
1	Character direction	Normal	Inverted	OFF
* 2 (3110)	CR	CR	LF	OFF
* 2 (910)	CR	Ignore CR	CR + LF	OFF
3	RESET in	Disable	Enable	ON
4	Memory switch	Disable Setting	Enable Setting	OFF

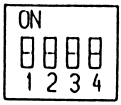
*: Difference may occur in accordance with the emulation set by the memory switch.

After setting DIP switch No. 4 to ON, turning the printer power on with the SEL switch pressed and held causes the printer enter the Manual memory switch setting mode.





Serial



Parallel

8. PRINT CONTROL FUNCTION

8.1 List of Control Codes

Symbol	Code (Hexadecimal)	Function	CBM910	iDP3110
LF	0A	Line feed after print	O*1	O*1
CR	0D	Carriage return and line feed	O*1	O*1
SI	0F	Normal size character	O	O
SO	0E	Double width character	O	O
US	1F	Normal size character	O	—
RS	1E	Double width character	O	—
CAN	18	Cancel data	O	—
DC2	12	Inverted character	O	—
DC1	11	Initialize	O	—
ESC + “B”	1B, 42	Feed paper continuously	O	O
ESC + “R”	1B, 52	Select international character	O	O
ESC + “t”	1B, 74	Select code page	O	O
ESC + “/”	1B, 2F	Register sentence	O	—
ESC + “! ”	1B, 21	Print registered characters	O	—
ESC + “&”	1B, 26	Register user-defined character	O	O
ESC + “%”	1B, 25	Enable/Disable registered characters	O*2	O*2
ESC + “K”	1B, 4B	Print bit image	O	O
FS + “W”+ 1	1C, 57, 1	Double height and width character	O	—
FS + “W”+ 0	1C, 57, 0	Clear double height and width character	O	—
ESC + “A”	1B, 41	Set line spacing	—	O
DC4	14	Clear double width character	—	O
DC3	13	Power down function	—	O
DC2	12	Power down function	—	O
ESC + “) ” + 55(H) + n1 + n2 + AAH	1B, 29, 55, n1, n2, AA	Change memory switch	O	O

*1: Invalid in some case. Refer to the descriptions for LF and CR in Control Code Details.
*2: Invalid in some case. Refer to the descriptions for Valid/Invalid of use-defined characters in Control Code Details.

8.2 Control Code Details

(1) Command for Line Feed After Printing (CR/LF)

By entering CR (0DH)/LF (0AH) codes, data in the print buffer is printed followed by a line feed. Without data in the print buffer, only a line feed is performed. This command is ignored just after buffer full in case of 910 emulation.
CR and LF are valid in the following conditions.

910 Emulation

	DS2-ON	DS2-OFF
Serial	CR and LF	LF only
Parallel	CR and LF	LF only

3110 Emulation

	DS2-ON	DS2-OFF
Serial	CR only	CR only
Parallel	LF only	CR only

(2) SI/SO and US/RS Commands

SI/SO codes function in the same manner as US/RS as long as 8-bit data are assigned (serial communication data bit length), which, however, are divided, under 7-bit assignment, into SI (20H~7FH characters) print assignment and SO (A0H~FFH characters) print assignment functions.

1. Standard letter assignment (SI/US) command:
   With SI (0FH)/US (1FH) codes input, lateral enlargement is cancelled and the data following are printed in standard letters. This command can cancel only lateral enlargement, which dose not apply to ×4 enlargement.

2. Laterally enlarged letter assignment (SO/RS) command:
With SO (0EH)/RS (1EH) codes input in any columns, the data following are printed in prints enlarged double in width.
Although standard and enlarged letters can be mixed within one line, automatic (buffer-full) printing takes place when the number of columns reaches 24 (or 40) counted in standard letters. With 910 emulation, laterally enlarged letter assignment is cleared by printing after line feed, followed by SI, US, and DC1. With 3110 emulation, it is cleared by printing after line feed by LF and CR, followed by SI, US, and DC4.

[Receiving Data]

SO	1234567890	CR

SO	123	SI	ABCD	CR

SO	123	SI	ABCD	SO	12	CR

SO	SO	12345678901B

[Results of Printing]

123456789
123ABCD
123ABC12
A12345678901B

(3) Data Cancel (CAN) Command

With CAN (18H) code input, print data held within the line before input of the CAN code are all cancelled.

[Receiving Data]

SO	123456	CAN	ABC	CR

[Results of Printing]

ABC

* As data "123456" are cancelled without the command "SO" cancelled, "ABC" is printed in lateral enlargement.

(4) Inverted Letter Assignment (DC2) Command

When data are input with DC2 (12H) attached at the beginning of a line (invalid when attached to any other place), data following are all printed in inverted letters. To cancel this, input either DC2 again or DC1 (initial setting.)

(5) Initial Setting (DC1) Command

With DC1 (11H) input, various conditions set after power supply are cancelled and the state as at supply of power is restored.
Content of the input buffer, however, is held unchanged.

(6) Power Down Function (DC2, DC3) Only when 3110 emulation is selected

In order to reduce power consumption when printer is waiting for the operation, 2 power down modes triggered by the codes DC2 and DC3 are incorporated into this product. When the printer receives power down commands (DC2 or DC3), it switches to the power down mode after all entered data is printed out.

a) DC2 (12H)
Unit switches to power down mode when DC2 code is entered.
Operation of the oscillator is not terminated.

[Power down release]
(a-1) RESET input
By applying "LOW" pulse to the RESET terminal for more than 4 ms, the power down mode is cleared, thereby switching the unit to operational condition approximately 500 ms after initialization.

b) DC3 (13H)
Unit switches to power down mode when DC3 code is entered.
Operation of the oscillator is terminated, reducing the power consumption to less than that of the DC2 power down mode.

(b-1) RESET input
By applying "LOW" pulse to the RESET terminal for more than 4 ms, the power down mode is cleared, thereby in HIGH-level switching the unit to operational condition approximately 500 ms after initialization.

(7) Continuous Paper Feed Assignment (ESC + "B" + n) Command

With ESC (1BH) +"B" (42H) + n code input, continuous paper feed at n-dot line is executed.
However, n allows continuous paper feed to be executed at even-numbered dot line in the range of 4 ≤ n ≤ 255. If n is specified otherwise, this command is cancelled.
When this command is entered, print data, if any, in the input buffer is printed. Print line (10-dot line) is included in the amount of line feed "n"; therefore, 4 ≤ n ≤ 9 provides a line space of "0".

(8) International Character Select (ESC + "R" + n) Command

By entering the code ESC (1BH) + "R" (52H) + n, characters input hereafter are set to the characters for the following countries.

n	Country	n	Country
0	U.S.A. (USA)	5	Sweden (SWE)
1	France (FRA)	6	Italy (ITA)
2	Germany (GER)	7	Spain (SPA)
3	U.K. (U.K)	8	Japan (JPN)
4	Denmark (DEM)		

With n other than those specified, the set value for the U.S. is assigned.
Note: At the printer power on or after RESET is applied, this setting differs depending on the status of memory switch setting.

(9) Codepage Select (ESC + "t" + n) Command

By the entry of ESC (1BH) + "t" (74H) + n code, the follwing character code table can be selected.

n	Character Code Table	n	Character Code Table
0	Codepage PC437	8	Codepage PC857
1	Katakana	9	Codepage WPC1252
2	Codepage PC858	10	Codepage PC864
3	Codepage PC860	11	Codepage PC869
4	Codepage PC863		
5	Codepage PC865	253	910 Emulation (Japan)*
6	Codepage PC852	254	910 Emulation (International)*
7	Codepage PC866	255	Space page (for user-defined characters)

*: In the factory setting, character set for model type is 910 Emulation (International) for model F and 910 Emulation (Japan) for model J.

(10) Sentence Registration (ESC + "/" + n) Command

With input of ESC (1BH) + "/" (2FH) + n + 'registered sentence' code, 24 (40)-bytes data following n are registered. Set a numeral of 1~8 to n.
With any other numeral having been set, data following are regarded as normal printing data, where no registration takes place and printing conducted.
Data cannot exceed one line which should be ended with CR (0DH) or LF (0AH).
To register sentences exceeding 24 (40) bytes, sentence up to 24 (40) bytes are registered, and the data following are printed out as printed data.
The ESC command cannot be registered.

(11) Registered Sentence Printing (ESC + "!" + n) Command

With ESC (1BH) + "!" (21H) + n code input, sentence already registered in the numeral assigned to n are printed.
Assign, to n, a numeral of 1 to 8. With any other numeral having been set, no execution takes place.

Note 1: As much as 24 (40) bytes of data can be registered. In case that 24 (40) columns are exceeded on printing (because of enlarged or ×4 letters having been assigned, etc.), printing is conducted up to 24 (40)th column and the columns overflowed are printed in the next line. Be sure to make registration in consideration of printing results.

Note 2: When double height and width character printing or inverted character printing is executed in registered sentence printing, this setting is active even after returning to normal printing unless that setting is cancelled.

Application Example

ESC	/	1	This is a pen	CR

Sentence registered in 1.

ESC	/	9	It this a pen ?	CR

No registration made with 9.

ESC	/	1	Is this a pen	CR

Overwritten on sentence registered initially in 1.

ESC	!	1

Printing of sentence registered in 1.

<Registered State>

1	It is pen
2	
3	
4	
5	
6	
7	
8	

<Printing Result>

Is this a pen ?
It is a pen
(Printed out with ESC + "!" + 1)

(12) Character Registration (ESC + "&") Command

1. **For 24-column model** (ESC + "&" + A1 + A2)
   Individual patterns can be registered by entering the code ESC (1BH) + "&" (26H) + A1 + A2, then entering the pattern data.
   A maximum of 224 characters can be registered, and any address in the range of 20H to FFH can be used for the registration. However, if a new pattern is registered in an address already in use, existing data is cleared and the newly entered data becomes valid.

   [Address setting]
   Specified address is matched to the character code and can be accessed likewise to the stored fixed character record. If a fixed character is defined in the specified address, the fixed character becomes invalid.
   A1 signifies the starting address for the registrations, A2 is the ending address.

[Method of data transmission]

d-1) Single character registration

Select the address to be defined (character code) from among 20H to FFH and designate is as A1. When registering a single character, starting and ending addresses match each other. That is, A1=A2.

<Example>

A 6 × 6 dot matrix full dot pattern is to be registered in address 41H (code for the fixed character "A". (Numerals are hexadecimal.)

ESC + "&" + A1 + A2 + "Pattern data (6 bytes)"

1B 36 41 41 FF FF FF FF FF FF

In the successive controls, a 6 × 8 dot matrix full dot is output whenever the character code 41H is specified. (Character "A" cannot be accessed.)

d-2) Multiple character registration

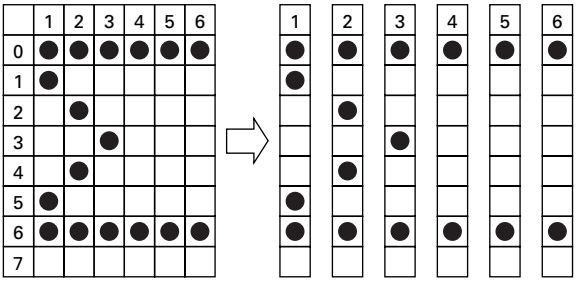
By repeating the single character registration, a maximum of 8 characters can be registered. When defining multiple characters in a successive address (character code), register pattern data for a maximum of 8 characters by designation A1 as the starting address and A2 as the ending address.

Note: A1 < A2, A2 – A1 ≤ 7

[Pattern data configuration] (For 24-column model)

Pattern data to be registered must consist of 6 bytes per character. That is, pattern data configured by a 6 × 8 dot matrix is broken up into 6 vertically positioned units each of which is represented by 1 byte of data. All together, 6 bytes of data are transmitted.

<Example> When transmitting the following data:



[Printing of registered letters]

To print registered character, in the same manner as printing other fixed characters, use the commands (CR, LF, ESC + B + n).

2. **For 40-column model**

In 910 emulation (ESC + "&" + C1 + A1 + A2)
In 3110 emulation (ESC + "&" + A1 + A2)

With ESC (1BH) + "&" (26H) + {C1} + A1 + A2 code and the pattern data following input, a pattern is registered. Only 910 emulation for { }.
Total 224 characters are available for registration into addresses of 20H~FFH.
When two pattern data have registered in the same address, those initially registered are cleared and the new data alone are made valid.

[Recognition of use of upper most bit]
For recognition of use or non-use of the uppermost bit by a character to be registered, set data to Parameter C1.

C1=0 (00H): Uppermost bit not used.
Other than C1=0: Uppermost bit used.

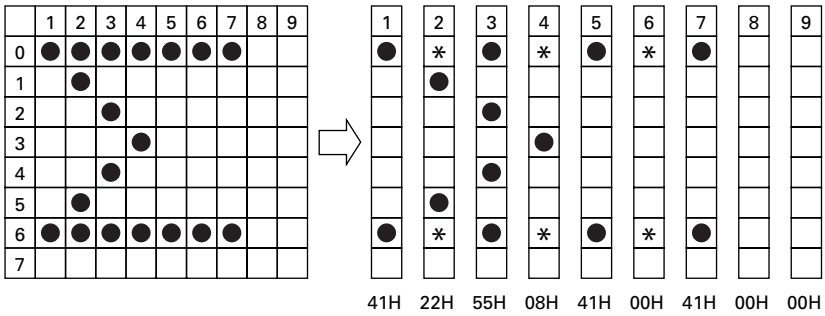
With 0 set to this parameter while the uppermost bit is in use, ×4 enlargement results in incomplete images for which the uppermost part is lacking.

[Setting of addresses]
A1 : Registration starting address (20H~FFH)
A2 : Registration ending address (20H~FFH)

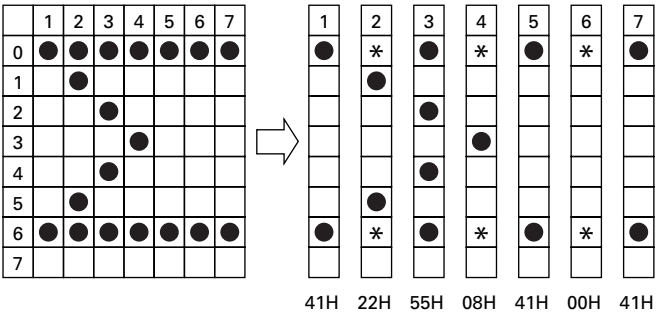
[Pattern data configuration] (For 40-column model)
Pattern data to be registered must consist of 9 bytes per character. That is, pattern data configured by 9 × 8 dot matrix is broken up into 9 vertically each of which is represented by 1 byte of data. All together, 9 bytes of data are transmitted.

<Example> When transmitting the following pattern data:

In 910 emulation



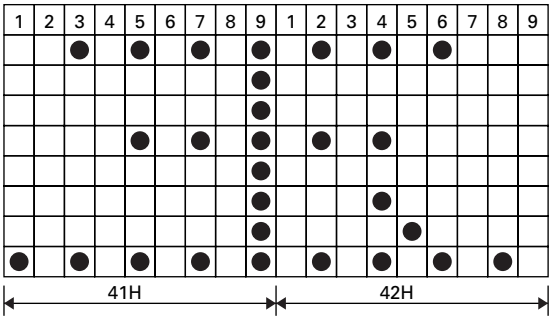
In 3110 emulation



As this printer takes half-dot printing system, dots cannot be aligned continuously in printing (horizontal) direction. Therefore, even if any pattern is specified at point "*" at the right of point "●" above, it cannot be registered as a pattern.

Configuring a double width character by registering the data for 2 characters is also possible.

<Example> When registering a Japanese character "玉" by using two characters 41H and 42H



Following ESC + & + 01 (Note) + 41H + 42H
sending data 80H, 00H, 81H, 00H, 89H, 00H, 89H, 00H, FFH
00H, 89H, 00H, A9H, 40H, 81H, 00H, 80H, 00H
allows "玉" to be registered at 41H and 42H.

[Printing registered character]
To print a registered character, executing Activate Registered Character command (ESC + "%" + 1) may be required in some case. If you want to return to the internal characters, it is necessary to disable the registered characters. Refer to the description for Valid/Invalid of Registered Characters command.

Note: With 0 being set in "C1" parameter even if data have been registered in the uppermost position, letter image registered is made incomplete.

(13) Registered Letter Valid/Invalid (ESC + "%" + n) Command

Whether a registered pattern is valid or invalid is set with ESC (1BH) + "%" (25H) + n code being input.

n = 1 (01H): Registered pattern to be made valid.
(Addresses for which no registration change has been conducted are taken as inside fixed characters.)

n = 0 (00H): Registered pattern to be made invalid.
(Taken as inside fixed character sets.)

With 910 emulation 40-digit version, to use the registered characters, it is necessary to set the registered characters to be valid using this command. With 3110 emulation and 910 emulation 24-digit version, the registered characters are valid at the registration of the user-defined characters without setting the registered characters to be valid.
To reset to the state where inside fixed characters are usable while registered characters are valid, it is necessary to disable the registered characters. Command for setting to invalid operates regardless of the emulation or number of digits.

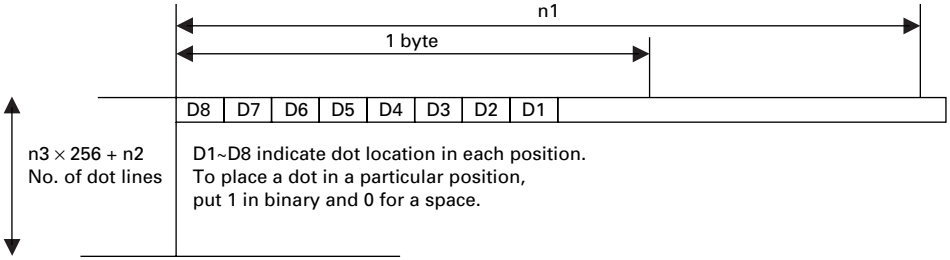
Registered Characters Enable/Disable Command	Set to Valid	Set to Invalid
910 Emulation (40 digits)	O	O
910 Emulation (24 digits)	×	O
3110 Emulation (40 digits)	×	O
3110 Emulation (24 digits)	×	O

O: Operation enabled by the Valid/Invalid command of registered characters.
×: As the registered characters are valid by the Register User-defined Character command, it is not necessary to set the registered characters to be valid.

(14) Bit Image Printing (ESC +"K"+ n1 + n2 + n3) Command

With ESC (1BH) + K (4BH) + n1 + n2 + n3 code being input, conversion from Text mode into Bit Image mode takes place. The n1/n2/n3 assigns amount of transmission of bit image data which follows these. Where, n1 represents the no. of bytes in lateral direction and n2 (lowermost)/n3 (uppermost) represent the no. of dot lines in vertical direction.

(Relations between data and print-out)



(Parameter assignable range)

Model	n1	n2	n3
24 columns	1~18	0~255	0~1
40 columns	1~23	0~255	0~1

In case that assignment has been made out of the assignable range or n2 = n3 = 0 has been assigned, Bit Image mode is cancelled and Text mode starts. With this printer, on completion of read-in of 4-dot-line data or on completion of n1/n2/n3 assigning data, lacking data are printed as spaces.

Note 1: With n1 = 23 having been assigned in 40-column model, 4 dots from the lowermost column (LSC-DOT) are made invalid. This is because the printing position in one line equals 180 dots.

Note 2: On termination of bit image printing, Text mode is reinstated.

(15) ×4 Enlarged Letter Assignment (FS + "W" + 1) Command

FS (1CH) + "W" (57H) + 1 (01H) code input, ×4 enlarged letters are assigned. Data following this code are printed vertically and laterally twice enlarged.

(16) ×4 Enlargement Cancel (FS + "W" + 0) Command

With FS (1CH) + "W" (57H) + 0 (00H) code being input, ×4 enlargement assignment is cancelled.

Note 1: Although standard and laterally enlarged letters can coexist in one line, automatic (buffer-full) printing takes place on reaching to 24th (40th) column counted in standard characters.

Note 2: With ×4 enlargement and double-width having been assigned, ×4 enlargement has priority.

Application Example)

[Receiving Data]

```
1C  W  1  123456789    CR
1C  W  0  ABC  1C  W  1  123  CR
1C  W  0  A  1C  W  1  12345678901B
```

<Printing Results>

```
123456789
ABC123
A1234567891B
```

The last letter, although in ×4 assignment, is printed in standard letter since it being in the 24th column. (For 40 column mechanism, this applies to the 40th column.)

(17) Set Line Spacing (ESC + "A" + n) Command

Sets a line space of "n2" dot line by the entry of ESC (1BH) + "A" (41H) + n code. Initial setting is 2-dot line space.
Here, n is an even number in the range of $0 \leq n \leq 255$.

Note: When an odd number is set to n, a line space of n−1 dots is specified. When n=0 or 1 is specified, continuous printing is permitted.

(18) Change Memory Switch (ESC + ")" + 55 (H) + n1 + n2 + AA(H))

Entering this code allows the contents of the memory switch shown in the table below to be changed.
When the printer receives this code, it enters the BUSY mode.
After writing to memory switch, reset is carried out and the receive buffer/print buffer is cleared and the initial value is restored and then the contents of the memory switch is reloaded.

n1	Function	n2	Content of Setting
0	Select international character set	0~8	See International Character Code Table.
1	Select code page.	0~11, 253, 254, 255	See Character Code Table Select Command.
2	Select 910/3110 emulation	0	910 Emulation
		1	3110 Emulation
3	ACK timing *1	0	Before
		1	Center
		2	After
4	Enable/Disable paper-near-end	0	Enable (Valid)
		1	Disable (Invalid)
5	Online state at power on	0	Select (Online)
		1	Deselect (Offline)
6	BUSY timing *1	0	Standard
		1	CBM-910
7	Buffer Size (Serial I/F)	0	2k bytes
		1	72 bytes

*1: Setting is permitted only for parallel interface.

NOTE

When the set value is outside the specified range, writing to memory is not carried out.

9. CHARACTER CODE TABLE

9.1 ASCII + 910 Emulation (International)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	DLE	SP	0	@	P	‘	p	_	┴	€					
1		XON	!	1	A	Q	a	q	▁	┬						
2			“	2	B	R	b	r	▂	┤						
3		XOF	#	3	C	S	c	s	▃	├						
4	EOT	DC4	$	4	D	T	d	t	▄	—						
5	ENQ		%	5	E	U	e	u	▅	—						
6			&	6	F	V	f	v	▆	ıı						
7			‘	7	G	W	g	w	▇	┃						
8		CAN	(	8	H	X	h	x	▏	┌						
9	HT		)	9	I	Y	i	y	▎	┐						
A	LF		*	:	J	Z	j	z	▍	└						
B		ESC	+	;	K	[	k	{	▋	┘						
C	FF	FS	、	<	L	\	l	|	▋	┌						
D	CR	GS	−	=	M	]	m	}	▋	┐						
E			.	>	N	^	n	~	▋	└						
F			／	?	O	_	o		┼	┘						

9.2 910 Emulation (Japan)

	8	9	A	B	C	D	E	F
0	_	┴	€	―	タ	ミ	円	
1	▁	┬	°	ア	チ	ム	年	
2	▂	┤	｢	イ	ツ	メ	月	€
3	▃	├	｣	ウ	テ	モ	日	
4	▄	—	、	エ	ト	ヤ		
5	▅	‗	・	オ	ナ	ユ		
6	▆	ıı	ヲ	カ	ニ	ヨ		
7	▇	┃	ｧ	キ	ヌ	ラ		
8	▏	┌	ｨ	ク	ネ	リ		
9	▎	┐	ｩ	ケ	ノ	ル		
A	▍	└	ｪ	コ	ハ	レ		
B	▋	┘	ｫ	サ	ヒ	ロ		
C	▋	｢	ｬ	シ	フ	ワ		
D	▋	｣	ｭ	ス	ヘ	ン		
E	▋	｣	ｮ	セ	ホ	“		
F	┼	ﾉ	ｯ	ソ	マ	°		

9.3 Codepage PC437 (USA, Standard Europe)

	8	9	A	B	C	D	E	F
0	Ç	É	á	⣿	└	╨	α	≡
1	ü	æ	í	▓	┴	╤	β	±
2	é	Æ	ó	▓	┬	╥	Γ	≥
3	â	ô	ú	│	├	╙	π	≤
4	ä	ö	ñ	┤	─	╘	Σ	⌠
5	à	ò	Ñ	╡	┼	╒	σ	⌡
6	å	û	a	╢	╞	╓	μ	÷
7	ç	ù	o	╖	╟	╫	τ	≈
8	ê	ÿ	¿	╕	╚	╪	Φ	°
9	ë	Ö	⌐	╣	╔	┘	θ	∙
A	è	Ü	¬	║	╩	┌	Ω	·
B	ï	¢	½	╗	╦	▉	δ	√
C	î	£	¼	╝	╠	▄	∞	n
D	ì	¥	¡	╜	═	▌	φ	2
E	Ä	Pt	≪	╛	╬	▐	∈	■
F	Å	ƒ	≫	┐	╧	▀	∩	

9.4 Katakana

	8	9	A	B	C	D	E	F
0	_	┴		―	タ	ミ	二	×
1	▁	┬	°	ア	チ	ム	卜	円
2	▂	┤	┌	イ	ツ	メ	十	年
3	▃	├	┘	ウ	テ	モ	刊	月
4	▄	─	、	エ	ト	ヤ	◢	日
5	▅	‗	・	オ	ナ	ユ	◣	時
6	▆	"	ヲ	カ	ニ	ヨ	◥	分
7	▇	┼	ァ	キ	ヌ	ラ	◤	秒
8	▏	┌	ィ	ク	ネ	リ	♠	〒
9	▎	┐	ゥ	ケ	ノ	ル	♥	市
A	▍	└	ェ	コ	ハ	レ	♦	区
B	▌	┘	ォ	サ	ヒ	ロ	♣	町
C	▋	⌠	ャ	シ	フ	ワ	●	村
D	▊	⌡	ュ	ス	ヘ	ン	○	人
E	▉	⌊	ョ	セ	ホ	"	／	▒
F	┼	⌋	ッ	ソ	マ	°	＼	

9.5 Codepage PC858 (Multilingual)

	8	9	A	B	C	D	E	F
0	Ç	É	á	⣿	└	ð	Ó	—
1	ü	æ	í	▓	┴	Ð	ß	±
2	é	Æ	ó	▓	┬	Ê	Ô	=
3	â	ô	ú	|	├	Ë	Ò	¾
4	ä	ö	ñ	┤	—	È	õ	¶
5	à	ò	Ñ	Á	┼	€	Õ	§
6	å	û	ª	Â	ã	Í	µ	÷
7	ç	ù	º	À	Ã	Î	þ	¸
8	ê	ÿ	¿	©	╚	Ï	Þ	°
9	ë	Ö	®	╣	╔	┘	Ú	¨
A	è	Ü	¬	‖	╩	┌	Û	·
B	ï	ø	½	╗	╦	█	Ù	¹
C	î	£	¼	╝	╠	▄	ý	³
D	ì	Ø	¡	¢	═	¦	Ý	²
E	Ä	×	«	¥	╬	Ì	¯	■
F	Å	ƒ	»	┐	¤	▀	´	

9.6 Codepage PC860 (Portuguese)

	8	9	A	B	C	D	E	F
0	Ç	É	á	⣿	└	╨	α	≡
1	ü	À	í	▓	┴	╤	β	±
2	é	È	ó	▓	┬	╥	Γ	≥
3	â	ô	ú	|	├	╙	π	≤
4	ã	õ	ñ	┤	—	╘	Σ	⌠
5	à	ò	Ñ	╡	┼	╒	σ	⌡
6	Á	Ú	ª	╢	╞	╓	µ	÷
7	ç	ù	º	╖	╟	╫	τ	≈
8	ê	Ì	¿	╕	╚	╪	Φ	°
9	Ê	Õ	Ò	╣	╔	┘	θ	•
A	è	Ü	¬	‖	╩	┌	Ω	.
B	Í	¢	½	╗	╦	█	δ	√
C	Ô	£	¼	╝	╠	▄	∞	ⁿ
D	ì	Ù	¡	╜	═	▌	φ	²
E	Ã	₧	«	╛	╬	▐	∈	■
F	Â	Ó	»	┐	╧	▀	∩	

9.7 Codepage PC863 (Canadian-French)

	8	9	A	B	C	D	E	F
0	Ç	É	¦	⣿	└	╨	α	≡
1	ü	È	´	▓	┴	╤	β	±
2	é	Ê	ó	▓	┬	╥	Γ	≥
3	â	ô	ú	│	├	╙	π	≤
4	Â	Ë	¨	┤	─	╘	Σ	⌠
5	à	Ï	⟩	╡	┼	╒	σ	⌡
6	¶	û	³	╢	╞	╓	μ	÷
7	ç	ù	¯	╖	╟	╫	τ	≈
8	ê	¤	Î	╕	╚	╪	Φ	°
9	ë	Ô	⌐	╣	╔	┘	θ	∙
A	è	Ü	¬	║	╩	┌	Ω	·
B	ï	¢	½	╗	╦	▉	δ	√
C	î	£	¼	╝	╠	▄	∞	ⁿ
D	=	Ù	¾	╜	═	▌	φ	²
E	À	Û	≪	╛	╬	▐	∈	■
F	§	ƒ	≫	┐	╧	▀	∩	

9.8 Codepage PC865 (Nordic)

	8	9	A	B	C	D	E	F
0	Ç	É	á	⣿	└	╨	α	≡
1	ü	æ	í	▓	┴	╤	β	±
2	é	Æ	ó	▓	┬	╥	Γ	≥
3	â	ô	ú	│	├	╙	π	≤
4	ä	ö	ñ	┤	─	╘	Σ	⌠
5	à	ò	Ñ	╡	┼	╒	σ	⌡
6	å	û	ª	╢	╞	╓	μ	÷
7	ç	ù	º	╖	╟	╫	τ	≈
8	ê	ÿ	¿	╕	╚	╪	Φ	°
9	ë	Ö	⌐	╣	╔	┘	θ	∙
A	è	Ü	¬	║	╩	┌	Ω	·
B	ï	ø	½	╗	╦	▉	δ	√
C	î	£	¼	╝	╠	▄	∞	ⁿ
D	ì	Ø	¡	╜	═	▌	φ	²
E	Ä	Pt	≪	╛	╬	▐	∈	■
F	Å	ƒ	¤	┐	╧	▀	∩	

9.9 Codepage PC852 (Eastern Europe)

	8	9	A	B	C	D	E	F
0	Ç	É	á	▒	└	đ	Ó	ˉ
1	ü	Ĺ	í	▓	┴	Đ	ß	´
2	é	Í	ó	▓	┬	Ď	Ô	˛
3	â	ô	ú	┤	├	Ë	Ń	ˇ
4	ä	ö	Ą	┤	─	ð	ń	˘
5	ů	Ľ	a	Á	┼	Ň	ň	§
6	ć	ľ	Ž	Â	Ă	Í	Š	÷
7	ç	Ś	ž	Ě	ă	Î	š	¸
8	ł	ś	Ę	Ş	╚	ě	Ŕ	°
9	ë	Ö	ę	╣	╔	┘	Ú	¨
A	Ő	Ü		║	╩	┌	ŕ	•
B	ő	Ť	ź	╗	╦	▌	Ű	ű
C	î	ť	Č	╝	╠	■	ý	Ř
D	Ź	Ł	ş	Ż	═	Ţ	Ý	ř
E	Ä	×	«	ż	╬	Ů	ţ	■
F	Ć	č	»	┐	¤	■	´	

9.10 Codepage PC866 (Russian)

	8	9	A	B	C	D	E	F
0	А	Р	а	⣿	└	╨	р	Ё
1	Б	С	б	▒	┴	╤	с	ё
2	В	Т	в	▒	┬	╥	т	Е
3	Г	У	г	▒	├	╙	у	є
4	Д	Ф	д	┤	─	╘	ф	Ї
5	Е	Х	е	╡	┼	╒	х	ї
6	Ж	Ц	ж	╢	╞	╓	ц	Ў
7	З	Ч	з	╖	╟	╫	ч	ў
8	И	Ш	и	╕	╚	╪	ш	°
9	Й	Щ	й	╣	╔	┘	щ	∙
A	К	Ъ	к	║	╩	┌	ъ	·
B	Л	Ы	л	╗	╦	▌	ы	√
C	М	Ь	м	╝	╠	▄	ь	№
D	Н	Э	н	╜	═	▐	э	¤
E	О	Ю	о	╛	╬	▐	ю	■
F	П	Я	п	┐	╧	▀	я	

9.11 Codepage PC857 (Turkish)

	8	9	A	B	C	D	E	F
0	Ç	É	á	⣿	└	⩀	Ó	–
1	ü	æ	í	▚	┴	a	ß	±
2	é	Æ	ó	▓	┬	Ê	Ô	
3	â	ô	ú	│	├	Ë	Ò	¾
4	ä	ö	ñ	┤	─	è	õ	¶
5	à	ò	Ñ	Á	┼		Õ	§
6	å	û	Ğ	Â	ã	Í	µ	÷
7	ç	ù	ğ	À	Ã	Î		¸
8	ê	±	¿	©	╚	Ï	×	°
9	ë	Ö	®	╣	╔	┘	Ú	¨
A	è	Ü	¬	‖	╩	┌	Û	•
B	ï	ø	½	╗	╦	▀	Ù	¹
C	î	£	¼	╝	╠	▄	ì	³
D	ı	Ø	¡	¢	═	¦	ÿ	²
E	Ä	Ş	«	¥	╬	ì	¯	■
F	Å	ş	»	┐	¤	▀	´	

9.12 Codepage WPC1252 (Windows Latin1)

	8	9	A	B	C	D	E	F
0	€			°	À	Ð	à	ð
1		‘	¡	±	Á	Ñ	á	ñ
2	‚	’	¢	²	Â	Ò	â	ò
3	*ƒ*	“	£	³	Ã	Ó	ã	ó
4	„	”	¤	´	Ä	Ô	ä	ô
5	…	•	¥	µ	Å	Õ	å	õ
6	†	–	¦	¶	Æ	Ö	æ	ö
7	‡	—	§	·	Ç	×	ç	÷
8	ˆ	˜	¨	¸	È	Ø	è	ø
9	‰	™	©	¹	É	Ù	é	ù
A	Š	š	ª	º	Ê	Ú	ê	ú
B	‹	›	«	»	Ë	Û	ë	û
C	Œ	œ	¬	¼	Ì	Ü	ì	ü
D			-	½	Í	Ý	í	ý
E			®	¾	Î	Þ	î	þ
F		Ÿ	¯	¿	Ï	ß	ï	ÿ

9.13 Codepage PC864 (Arabic)

	8	9	A	B	C	D	E	F
0	°	β	(RSP)	٠	ﻍ	ذ	ـ	ﻉ
1	·	∞	(SHY)	١	ء	ر	ف	ﻊ
2	•	ϕ	ّ	٢	آ	ز	ق	ن
3	√	±	£	٣	أ	س	ك	ه
4	▒	½	¤	٤	ؤ	ش	ل	ﻎ
5	┼	¼	٥	٥	ح	ص	م	ى
6	┤	≈		٦	ﻚ	ض	ن	ي
7	╞	«	€	٧	ا	ط	ه	
8	╪	»	١	٨	ب	ظ	و	ق
9	╡	ﻷ	ب	٩	ة	ع	ى	ﻷ
A	╒	ﻵ	ت	ف	ت	غ	ﻲ	ﻵ
B	╤		ث	؛	ث	إ	ظ	ل
C	╘		ء	س	ج	ـ	ﻫ	ﻚ
D	╧	ﻹ	ج	ش	ح	÷	ﻎ	ي
E	╠	ﻹ	ح	ص	خ	×	ﻊ	■
F	═	،	خ	؟	د	ع	م	

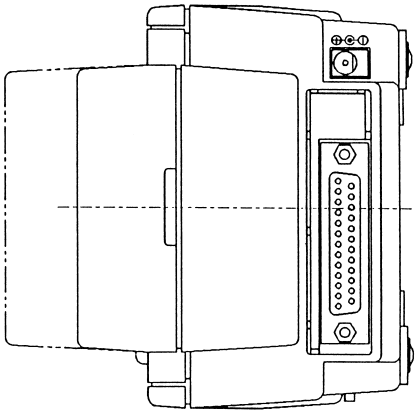
9.14 Codepage PC869 (Greek)

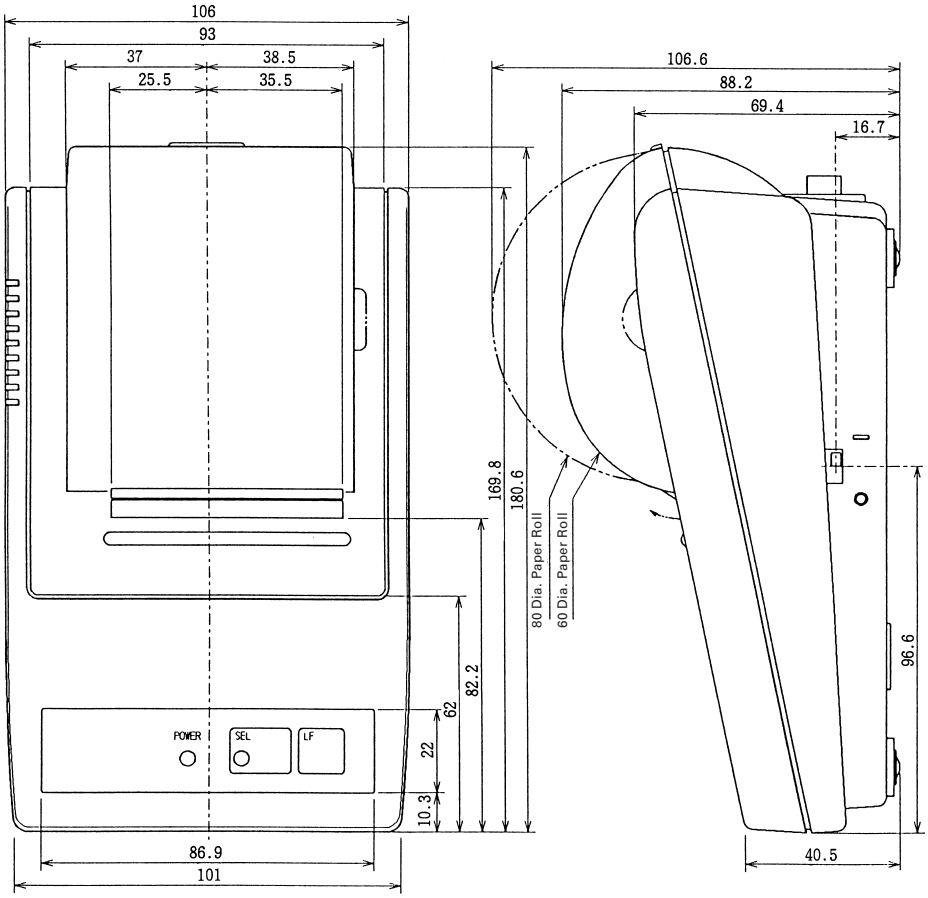
	8	9	A	B	C	D	E	F
0		Ί	ΐ	▒	┼	Τ	ζ	(SHY)
1		Ϊ	ί	▓	╞	Υ	η	±
2		Ό	ό	■	╪	Φ	θ	υ
3			ύ	┤	╡	Χ	ι	φ
4			Α	╢	╒	Ψ	κ	χ
5		Ύ	Β	Κ	╤	Ω	λ	§
6	Ά	Ϋ	Γ	Λ	Π	α	μ	ψ
7	€	©	Δ	Μ	Ρ	β	ν	
8	·	Ώ	Ε	Ν	╠	γ	ξ	°
9	¬	²	Ζ	╣	═	╬	ο	¨
A	¦	³	Η	╗	╦	╧	π	ω
B	‘	ά	½	╝	╨	▄	ρ	ϋ
C	’	£	Θ	╜	╫	▬	σ	ό
D	Έ	έ	Ι	Ξ	╪	δ	ς	ώ
E	—	ή	«	Ο	╬	ε	τ	■
F	Ή	ί	»	╛	Σ	▬	’	(RSP)

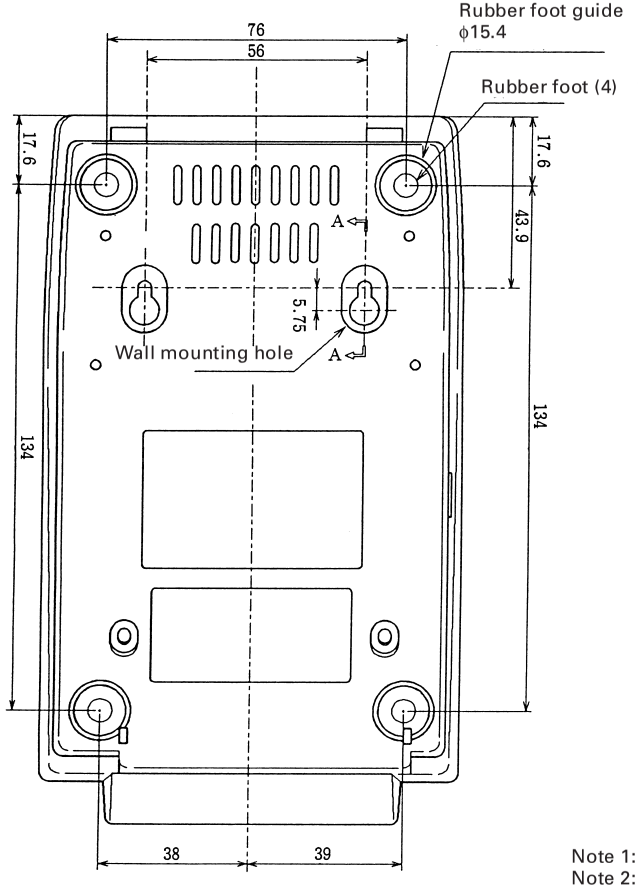
9.15 International Character Code Table

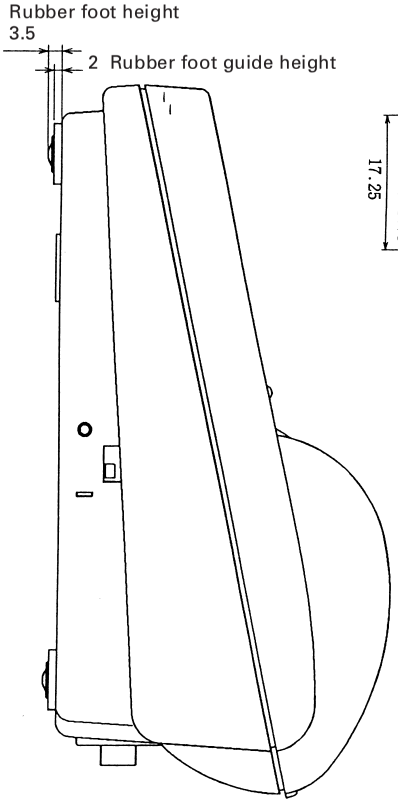
	Country	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
0	U.S.A.	#	$	@	[	\	]	^	‘	{	|	}	~
1	France	#	$	à	°	ç	§	^	‘	é	ù	è	¨
2	Germany	#	$	§	Ä	Ö	Ü	^	‘	ä	ö	ü	β
3	U.K.	£	$	@	[	\	]	^	‘	{	|	}	~
4	Denmark I	#	$	@	Æ	Ø	Å	^	‘	æ	ø	å	~
5	Sweden	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
6	Italy	#	$	@	°	\	é	^	ù	à	ò	è	ì
7	Spain	Pt	$	@	¡	Ñ	¿	^	‘	¨	ñ	}	~
8	Japan	#	$	@	[	¥	]	^	‘	{	|	}	~

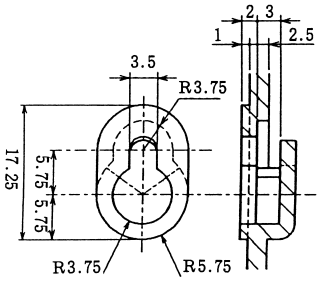
10. EXTERNAL DIMENSIONS



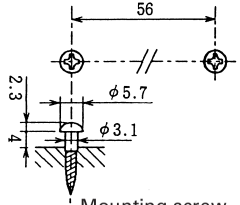








Details A-A (2/1)



Mounting screw
Drawing for Installation
Dimensions (Remarks)

Note 1: Drawings above indicate the bottom and side views of CBM-910 main body.
Note 2: The wall hanging screw head shall be below 3 mm long.

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